DEPARTMENT OF PHYSICAL SCIENCES

The Department of Physical Sciences offers the following undergraduate degree programs:

BS in Chemistry
BS in Chemistry/Engineering (offered as a dual degree program with Clemson University)
BS in Chemistry with Forensic Science Concentration
BS in Chemistry with Health Sciences Concentration
BS in Chemistry with Secondary Certification
BS in Environmental Science
BS in Environmental Science with Forensic Science Concentration

The course requirements for each of these degree programs are on the respective program worksheets on pages 335-348.

The Department's webpage:
https://www.lander.edu/academics/colleges-schools/college-science-mathematics/physical-sciences/index.html
contains information about the individual programs of study, scholarships available for students majoring in Chemistry, Chemistry/Engineering Dual Degree, Chemistry with a concentration in Forensic Science, Chemistry with a concentration in Health Sciences, Chemistry with Secondary Education, Environmental Science, or Environmental Science with a concentration in Forensic Science, and links to the faculty members.

An honors program is available in chemistry. Minors are available in chemistry, environmental science, and forensic science.

Curricular programs are also offered in pre-medicine, pre-pharmacy, pre-dentistry, and other pre-professional allied health science fields.

Courses in astronomy, chemistry, physics, and physical science are offered as support courses for professional, pre-professional, and general education areas of study.

Chemistry Major

Chemistry is an experimental science that has as its goal the development of an atomic and molecular interpretation of the properties and behavior of matter. The fundamental nature and extensive application of chemistry to other fields of science gives the chemistry graduate a variety of career choices and advanced study opportunities. Among these are industrial chemistry, government service, sales or supervision, secondary school teaching, and entry into graduate or professional schools. A program of maximum flexibility can best serve this wide variety of potential interests.

The student will have competency in the following areas prior to graduating from Lander University with a degree in chemistry:

1. Chemistry: Fundamental principles of analytical, inorganic, organic, and physical chemistry.
2. Mathematics: Fundamental principles of differential, integral, and multivariable calculus.
3. Physics: Fundamental principles of mechanics, heat, electricity, magnetism, and waves.

Chemistry Goals

Students graduating with a BS Degree in Chemistry will

1. have developed an understanding of modern scientific concepts and issues related to organic, inorganic, analytical, and physical chemistry;
2. demonstrate appropriate scientific communication skills to prepare and present a seminar presentation on a literature topic or undergraduate research experience; and
3. demonstrate skills necessary for safe and appropriate collection, analysis, and interpretation of data in chemistry laboratory experiments.

The core requirements for a Bachelor of Science degree in chemistry are CHEM 111-CHEM 112, CHEM 221, CHEM 331, and CHEM 401. Additional requirements include BIOL 112, CHEM 197, CHEM 198, CHEM 199, CHEM 222, CHEM 330, CHEM 341, CHEM 402, PHYS 202 or PHYS 212, PSCI 499, plus a minimum of nine hours of elective courses from CHEM 260 or above. Required cognates include MATH 123 and MATH 211 or MATH 141 and MATH 211, PHYS 201 or PHYS 211, and a minimum of nine hours of electives from the following: ASTR 101 or higher, BIOL 111 or higher, CHEM 260 or higher, CIS 130 or higher, ES 111 or higher, GEOL 111 or higher, MATH 141 or

higher, PHYS 203, PHYS 314, or PSCI 451. The program features extensive student participation in experimental laboratory work. In many instances, experiments are chosen to coincide with a student's specific needs and interests.

Chemistry courses are normally offered according to the following schedule:

Every Fall	Every Spring
CHEM 111	CHEM 112
CHEM 221	CHEM 197
CHEM 330	CHEM 198
CHEM 401	CHEM 199
	CHEM 222
	CHEM 331
	CHEM 341
	CHEM 402
	PSCI 499

Other specialized courses may be offered as needed.

Chemistry Honors Program

A student graduating from Lander University with the Bachelor of Science degree in chemistry may qualify for the "Honors Degree in Chemistry" if the following conditions have been met:

1. Upon graduation, the student must have at least a GPA of 3.5 in both overall coursework and chemistry program requirements. There can be no grade below a "C" in any chemistry coursework, including repeated courses.
2. In addition to the normal course requirements, the following courses must be taken:
   Calculus: MATH 141
   Chemistry elective: CHEM 260 or above
3. The student must complete a research project in which:
   a) The research is of sufficient quality to receive credit in CHEM 409 or CHEM 410;
   b) The results are submitted for publication in a scientific journal or presentation at a scientific meeting (such as the South Carolina Academy of Science or the Western Carolinas Section of the American Chemical Society);
   c) The results are presented in seminar format to the science faculty, students, and invited guests; and
   d) The project may be completed entirely at Lander or initiated off campus during a summer research program.

Transfer students entering this program must have at least a 3.5 GPA overall and in chemistry program requirements from their former institution(s) and must meet the above guidelines.

Chemistry with Secondary Education Certification

Individuals who want to teach chemistry rather than work in a laboratory will find that this program meets all their needs. Students will have the opportunity to engage with two different types of practitioners (scientists and experienced teachers) over the course of their education. A comprehensive chemistry education and state of the art technology will be introduced in classes such as inorganic, organic, instrumental, and biological chemistries. Classroom management, national science teaching standards, and educational technology will be introduced in education coursework. Students will participate in a series of clinical experiences beginning with observations of local high school classrooms and leading to a semester-long student-teaching position as part of the education coursework.

This program adheres to the College of Education teacher disposition and screening requirements; students will be required to achieve all of the benchmarks for the Department of Teacher Education in order to successfully complete the program. State regulations regarding teacher certification may change during pursuit of the Chemical Education degree.

In order to ensure that appropriate progress is being made, students majoring in Chemical Education are encouraged to meet with their advisor regularly (at least twice each semester) to stay abreast of any changes in licensure requirements.

Students enrolled in Secondary (History, English, Chemistry, Mathematics) or PK-12 (PE, Art, Music):

Provisional Status

1. Demonstrate professional behaviors and dispositions* at all times.
2. Maintain a minimum 2.75 GPA on Lander coursework; achieve a grade of "B" or higher in each field experience; achieve a grade of "C" or higher in all EDUC, ECED, MONT, and SPED courses (see catalog for further details, including each department's GPA requirements within the specific content area).
3. Pass **ALL** 3 sections of Praxis Core or have exempting SAT/ACT scores on file at Lander University and confirmed by the Department of Teacher Education.
4. Successfully complete other reviews as required by departments in specific content areas.
5. Apply for admission to the professional program in teacher education (see Department of Teacher Education section of catalog for requirements).

Candidate Status

1. Enter candidacy with formal admission to the professional program in teacher education.
2. Demonstrate professional behaviors and dispositions* at all times.
3. Maintain a 2.75 GPA on Lander coursework; achieve a grade of "B" or higher in each field experience; achieve a grade of "C" or higher in all EDUC, ECED, MONT, and SPED courses (see catalog for further details, including each department's GPA requirements within the specific content area).
4. Take the Praxis II prior to the student teaching semester**
5. Take the PLT (Principles of Learning and Teaching) by the end of the student teaching semester **
6. Successfully complete other departmental requirements, reviews, projects, or milestones.

Students not meeting one or more of the requirements will not progress to Candidate Status.

* Lander University has high expectations for all teacher education majors. Teacher education majors who exhibit unacceptable dispositions may be removed from the program. Procedures for removal are outlined within the Department of Teacher Education handbook.
**Praxis II and PLT must be passed to apply for certification with the South Carolina Department of Education.

Chemistry/Engineering Dual Degree

Students who wish to combine study in chemistry with further study in chemical engineering may do so under the Clemson University-Lander University Engineering Dual Degree Program. Under this cooperative agreement, students will spend the first two years of their college career at Lander University in a chemistry program of study and the remaining three years at Clemson University in chemical engineering. Summer courses may be required.

A student who completes this five-year program of study will have had the experience of dividing his or her academic career between the liberal arts environment of a small university campus and the engineering climate of a large technically oriented university. This unique combination of study on two differently oriented campuses will provide a student with excellent engineering and chemistry training, complemented by study in the humanities and social sciences. Thus, a graduate from this dual degree program will be well trained to pursue a technical career strongly oriented to problems relevant to today's society.

Students apply to Clemson for admission in their second academic year at Lander. They must be recommended by the Lander faculty. Those students who do not maintain a GPA that would be competitive for entrance to Clemson may not be recommended. A grade of "C" or better is required in all courses transferred to Clemson.

Acceptance into the Clemson engineering program is at the discretion of Clemson University. Clemson recommends that the prospective student attend summer school at Clemson following the sophomore year at Lander.

All dual degree engineering majors will be able to enter Clemson University at a level competitive with students already at that university.

The student will have competency in the following areas prior to leaving for Clemson University:

1. Chemistry: Fundamental principles of analytical and organic chemistry.
2. Mathematics: Differential, integral, and multivariable calculus, and differential equations.
3. Physics: Mechanics, heat, electricity, atomic and nuclear physics, and magnetism.
4. Engineering: Engineering problem analysis, material and mass balances on chemical process systems, and engineering case studies.

5. Calculator: Proficiency in the use of an advanced scientific calculator.

Chemistry with Forensic Science Concentration

Students who pursue the forensic science concentration will be able to obtain their Bachelor of Science degree in Chemistry while focusing on crime lab applications. Coursework focuses on developing an understanding of how evidence collection and analysis can lead to conclusions about past actions, as well as analytical skills that will not destroy trace evidence. Courses such as criminalistics, microscopical methods, and toxicology have been incorporated such that students have the hands-on experience and skills necessary to be competitive in the job market. Students that complete this major will be prepared to seek jobs with local, state, and federal criminalistics labs, as well as with museums and non-profit organizations.

Chemistry with Health Sciences Concentration

Chemistry majors interested in pursuing health profession careers, such as pharmacy and medicine, are encouraged to pursue the health sciences concentration. It is designed to allow students to take those courses which are prerequisites for the various health professions as part of the concentration. This program offers flexibility in coursework so students are prepared for health-related entrance exams such as the MCAT.

Environmental Science Major

Environmental science is an interdisciplinary field that unites the physical and biological sciences with the social sciences and uses powerful sampling and modeling tools and analyses to address real world problems. Students will complete coursework in environmental science, biology, chemistry, social sciences, and statistics. Completing the environmental science program at Lander University will help to prepare students for a career in environmental science, sustainability, consulting, environmental policy, public health, governmental service, agriculture and forestry, and many other fields. This major also serves as an excellent foundation for students planning to enter graduate programs.

This program features extensive hands-on learning, both in the field and the laboratory. Students complete a series of courses specifically designed to build necessary skills to prepare them for the job market. Students will learn relevant field data sampling and collection techniques and how to organize and analyze data. They will learn to use GIS to create maps and complete spatial data analyses, and they will collect and analyze large datasets using modern statistical languages and machine learning models. Students will complete course-embedded projects and presentations aimed at audiences specific to practicing environmental scientists. Students also have the opportunity to complete internships and research projects relevant to their chosen career path.

The core requirements for a Bachelor of Science degree in environmental science are BIOL 111, BIOL 306, BIOL 415, CHEM 111, CHEM 112, CHEM 221, CHEM 331, CHEM 420, ES 111 or ES 265, ES 301 or 355, ES 302 or ES 445, PSCI 112, and PSCI 499. Five required major electives are chosen from the following courses: BIOL 112, BIOL 213, BIOL 214, BIOL 303, BIOL 308, BIOL 313, BIOL 409 or 410, BIOL 421, CHEM 222, CHEM 260, CHEM 301, CHEM 330, CHEM 341, CHEM 360, CHEM 401, CHEM 409 or 410, HIST 341, POLS 308, POLS 379, PUBH 310, PUBH 415, or SOCI 363.

Major courses are normally offered according to the following schedule.

Every Fall Semester	**Every Spring Semester**
BIOL 111	BIOL 306
BIOL 415	CHEM 112
CHEM 111	CHEM 331
CHEM 221	ES 302
CHEM 420	ES 355
ES 111	ES 445
ES 265	PSCI 499
ES 301	
PSCI 112	

Other specialized courses are offered as needed.

Environmental Science Goals

The goal of the environmental science program is to produce graduates who are prepared for a career in the field and for post-baccalaureate pursuits including graduate or professional schools.

Students graduating with a BS Degree in Environmental Science will

1. demonstrate an understanding of the foundational concepts in environmental science,
2. successfully explain and apply the process of science by designing experiments, collecting and analyzing data, and developing and using quantitative and qualitative models relevant to environmental science,
3. demonstrate appropriate writing and presentation skills for different audiences common in the discipline of environmental science.

Environmental Science with Forensic Science Concentration

The environmental science major with a concentration in forensic~~s~~ science prepares students interested in careers with environmental forensics components (*e.g.,* working in industry, consulting firms, law firms, and non-governmental organizations, or determining environmental liability for environmental labs or regulatory agencies). This ~~emphasis~~ concentration ensures that students develop strong analytical skills and an understanding of the legal framework required of this field.

Chemistry Minor

A minor in chemistry consists of 18 credit hours distributed as follows: CHEM 111, CHEM 112, CHEM 221, plus a minimum of 6 hours of additional chemistry courses above CHEM 221, of which 3 hours are at the CHEM 260 or above level. (CHEM 381 may not be used to satisfy the requirements of the chemistry minor.) A grade of "C" or better is required in all chemistry courses taken for the minor.

Environmental Science Minor

A minor in environmental science consists of a minimum of 18 credit hours. Requirements are BIOL 111, CHEM 111 or ES 111 or PSCI 112, and at least three additional courses in ES. A grade of "C" or better is required in all courses counted for the minor.

Forensic Science Minor

A minor in forensic science consists of 25 credit hours distributed as follows: CHEM 101, CHEM 111, CHEM 112, CHEM 221, CHEM 260, CHEM 360, and BIOL 112. A grade of "C" or better is required in all courses taken for the minor.

Pre-Professional Curricula

Lander University offers curricular programs in the following areas: pre-medicine, pre-dentistry, pre-optometry, pre-veterinary medicine, pre-pharmacy, pre-physical therapy, and pre-occupational therapy. Because of the nature of the courses required to fulfill the requirements of these programs, most students in these programs major in Chemistry or Biology.

All pharmacy degree programs in the State of South Carolina are now 6-year Pharm. D. programs. As such, they require students to have a minimum of 66 credit hours before applying to pharmacy school.

Although most professional schools have common core curriculum requirements, there are differences. In addition, some schools have regular admission programs, early decision programs, and early admission programs. In the early admission program, the student can be accepted as early as the third semester of undergraduate study. There are variations in the number of hours and courses required by similar programs offered at different institutions. To better serve Lander's students, each program has a designated faculty advisor. As soon as the decision to enter one of the health-related programs is made, the student and his/her advisement records will be turned over to the appropriate health program advisor in the Department of Physical Sciences.

Successful completion of the following Lander courses will allow a student to apply to pharmacy programs at the Medical University of South Carolina, the University of South Carolina, and Presbyterian College:

Courses	Hours
CHEM 111-112	8
BIOL 111-112	8
MATH 123 or 141	3 or 4
ENGL 101-102	6
MATH 211	3
CHEM 221-222	8
ECON 201 or ECON 202	3
PHYS 201-202 or 211-212	8
SPCH 101	3
BIOL 202	4
BIOL 203 or 311	4
BIOL 204 or 421	4
HISTORY	3
FINE ARTS	3
PSYC	3
SOCIAL SCIENCE ELECTIVES (including psychology and history)	9

Successful completion of the following Lander courses will prepare students to score well on the MCAT and will make the students very competitive once admitted to a school of medicine. The prerequisites for medical school include:

Courses	Hours
CHEM 111-112	8
BIOL 111-112	8
MATH	6
CHEM 221-222	8
PHYS 201-202 or 211-212	8
ENGL 101-102	6
PSYC 101	3
SOCI 101	3

Other science courses are recommended to better prepare the student.

2025-2026 PROGRAM REQUIREMENTS

DEGREE: BACHELOR OF SCIENCE
MAJOR: CHEMISTRY

Credit Hours

GENERAL EDUCATION REQUIREMENTS
(For approved courses see General Education: www.lander.edu/gen-ed.)

A. Core Skills (9 hours)
ENGL 101: Writing and Inquiry I 3
ENGL 102: Writing and Inquiry II 3
MATH 123: Calculus and its Applications 3
or MATH 141: Single Variable Calculus I

B. Humanities and Fine Arts 6
(6 hours selected from 2 different disciplines)

C. Behavioral and Social Perspectives 6
(6 hours selected from 2 different disciplines)
If you already have credit for HIST 111, do not take HIST 111R; if you already have credit for HIST 112, do not take HIST 112R; if you already have credit for POLS 101, do not take POLS 101R.

D. Scientific and Mathematical Reasoning
(7 hours selected from 2 different disciplines, 1 lab science required)
MATH 211: Introduction to Statistical Methods I 3
PHYS 201: Introductory Physics I or PHYS 211: General Physics I 4

E. Founding Documents of the United States 3
HIST 111R: United States History to 1877 or
HIST 112R: United States History since 1877 or
POLS 101R: American National Government
If you already have credit for HIST 111, do not take HIST 111R; if you already have credit for HIST 112, do not take HIST 112R; if you already have credit for POLS 101, do not take POLS 101R.

F. World Cultures 3

G. LINK 101: Leadership, Involvement, Networking and Knowledge 1

LINK 101 is required of all new transfer students who have earned less than 24 credit hours of college-level work and all first-time freshmen.

TOTAL GENERAL EDUCATION REQUIREMENTS 35

If all of the General Education requirements are met and/or waived, and the credit hours do not add up to at least 30, the General Education requirements are not complete. If below 30, additional General Education courses from any category must be taken until the total hours add up to at least 30 hours.

MAJOR PROGRAM CORE REQUIREMENTS

CHEM 111: General Chemistry I 4
CHEM 112: General Chemistry II 4
CHEM 221: Organic Chemistry I 4
CHEM 331: Chemical Instrumentation 4
CHEM 401: Physical Chemistry I 4

MAJOR PROGRAM ADDITIONAL REQUIREMENTS

BIOL 112: Foundations in Cellular and Molecular Biology 4

CHEM 197: Scientific Communications I	1
CHEM 198: Scientific Communications II	1
CHEM 199: Scientific Communications III	1
CHEM 222: Organic Chemistry II	4
CHEM 260: Microscopical Methods or above (except CHEM 381)	3-4
CHEM 260: Microscopical Methods or above (except CHEM 381)	3-4
CHEM 260: Microscopical Methods or above (except CHEM 381)	3-4
CHEM 330: Analytical Chemistry	5
CHEM 341: Inorganic Chemistry	4
CHEM 402: Physical Chemistry II	4
PHYS 202: Introductory Physics II or 212: General Physics II	4
PSCI 499: Senior Seminar	3
Choose **three** of the following: ASTR 101: Introduction to Astronomy or higher BIOL 111: Foundations in Ecology, Evolution, and Genetics or higher CHEM 260: Microscopical Methods or higher CIS 130: Problem Solving and Programming Methods or higher ES 111: Environmental Sustainability or higher GEOL 111: Physical Geology or higher MATH 141: Single Variable Calculus I or higher PHYS 203: Electronics PHYS 314: Fluids and Heat Transfer PSCI 451: Science Pedagogy	9-12
TOTAL MAJOR PROGRAM REQUIREMENTS	69-75
ADDITIONAL ELECTIVES	**10-16**
TOTAL FOR BS DEGREE	120

Coursework must include at least 30 hours earned in 300 or above level courses, of which 12 hours must be in the major.

See 4-year major guides for recommended order in which to take courses
https://www.lander.edu/academics/registrars-office/major-guides.html

2025-2026 PROGRAM REQUIREMENTS

DEGREE: BACHELOR OF SCIENCE
MAJOR: CHEMISTRY
CONCENTRATION: DUAL ENGINEERING

	Credit Hours
GENERAL EDUCATION REQUIREMENTS	
(For approved courses see General Education: www.lander.edu/gen-ed.)	
A. Core Skills (9 hours)	
ENGL 101: Writing and Inquiry I	3
ENGL 102: Writing and Inquiry II	3
MATH 141: Single Variable Calculus I	4
B. Humanities and Fine Arts	
(6 hours selected from 2 different disciplines)	
ART 101: Introduction to Art or MUSI 101: Introduction to Music or ENGL 200-level	3
Humanities and Fine Arts (Taken at Clemson)	3
C. Behavioral and Social Perspectives	
(6 hours selected from 2 different disciplines)	
ECON 101: Economics in Society or POLS 103: Introduction to World Politics or PSYC 101: General Psychology	3
Behavioral and Social Perspectives (Taken at Clemson)	3
D. Scientific and Mathematical Reasoning	
(7 hours selected from 2 different disciplines, 1 lab science required)	
MATH 142: Single Variable Calculus II	4
PHYS 211: General Physics I	4
E. Founding Documents of the United States	3
HIST 111: United States History to 1877 or POLS 101: American National Government (Taken at Clemson as HIST 1010 or POSC 1010)	
F. World Cultures	
ES 314: Cultural Perspectives of Global Climate Change	3
G. LINK 101: Leadership, Involvement, Networking and Knowledge	1
LINK 101 is required of all new transfer students who have earned less than 24 credit hours of college-level work and all first-time freshmen.	
TOTAL GENERAL EDUCATION REQUIREMENTS	37
If all of the General Education requirements are met and/or waived, and the credit hours do not add up to at least 30, the General Education requirements are not complete. If below 30, additional General Education courses from any category must be taken until the total hours add up to at least 30 hours.	
MAJOR PROGRAM CORE REQUIREMENTS	
CHEM 111: General Chemistry I	4
CHEM 112: General Chemistry II	4
CHEM 221: Organic Chemistry I	4
CHEM 331: Chemical Instrumentation	4
CHEM 401: Physical Chemistry I (Taken at Clemson)	4

MAJOR PROGRAM ADDITIONAL REQUIREMENTS

CHEM 197: Scientific Communications I	1
CHEM 198: Scientific Communications II	1
CHEM 199: Scientific Communications III	1
CHEM 222: Organic Chemistry II	4
CHEM 330: Analytical Chemistry	5
CHEM 351: Mass and Energy Balance (Taken at Clemson):	4
CHEM 381: Cultural Perspective of Pollution	3
CHEM 402: Physical Chemistry II (Taken at Clemson)	4
CIS 130: Problem Solving and Programing Methods	4
CIS 202: Computer Applications for Engineers	3
MATH 241: Multivariable Calculus	4
MATH 242: Differential Equations	4
PHYS 212: General Physics II	4
PHYS 314: Fluids and Heat Transfer (Taken at Clemson)	4
PSCI 499: Senior Seminar (Taken at Clemson)	3
TOTAL MAJOR PROGRAM REQUIREMENTS	69
ADDITIONAL ELECTIVES	**14**
TOTAL FOR BS DEGREE	120

Upon completion of the 2nd year at Lander, students will have completed 78 credit hours of coursework. However, students will have only completed 28 of the 37 hours of General Education requirements. In addition to transferring back the needed general education credits, students will also have to complete and transfer back: CHE 2110, CHE 2300, CHE 2200, CHE 3390, CHE 3320, CHE 3400, CHE 4430, CHE 4440. Furthermore, students must complete the Clemson degree requirements for a BS in chemical engineering to obtain the BS degree in chemistry from Lander. This option is available ONLY to students who pursue a degree in CHEMICAL Engineering at Clemson.

Coursework must include at least 30 hours earned in 300 or above level courses, of which 12 hours must be in the major.

See 4-year major guides for recommended order in which to take courses
https://www.lander.edu/academics/registrars-office/major-guides.html

2025-2026 PROGRAM REQUIREMENTS

DEGREE: BACHELOR OF SCIENCE
MAJOR: CHEMISTRY
CONCENTRATION: FORENSIC SCIENCE

Credit Hours

GENERAL EDUCATION REQUIREMENTS

(For approved courses see General Education: www.lander.edu/gen-ed.)

A. Core Skills (9 hours)

ENGL 101: Writing and Inquiry I	3
ENGL 102: Writing and Inquiry II	3
MATH 123: Calculus and its Applications	3

B. Humanities and Fine Arts 6
(6 hours selected from 2 different disciplines)

C. Behavioral and Social Perspectives
(6 hours selected from 2 different disciplines)

PSYC 101: General Psychology	3
Behavioral and Social Perspectives	3

If you already have credit for HIST 111, do not take HIST 111R; if you already have credit for HIST 112, do not take HIST 112R; if you already have credit for POLS 101, do not take POLS 101R.

D. Scientific and Mathematical Reasoning
(7 hours selected from 2 different disciplines, 1 lab science required)

MATH 211: Introduction to Statistical Methods I	3
PHYS 201: Introductory Physics I or PHYS 211: General Physics I	4

E. Founding Documents of the United States 3
HIST 111R: United States History to 1877 or
HIST 112R: United States History since 1877 or
POLS 101R: American National Government

If you already have credit for HIST 111, do not take HIST 111R; if you already have credit for HIST 112, do not take HIST 112R; if you already have credit for POLS 101, do not take POLS 101R.

F. World Cultures 3

G. LINK 101: Leadership, Involvement, Networking and Knowledge 1

LINK 101 is required of all new transfer students who have earned less than 24 credit hours of college-level work and all first-time freshmen.

TOTAL GENERAL EDUCATION REQUIREMENTS 35

If all of the General Education requirements are met and/or waived, and the credit hours do not add up to at least 30, the General Education requirements are not complete. If below 30, additional General Education courses from any category must be taken until the total hours add up to at least 30 hours.

MAJOR PROGRAM CORE REQUIREMENTS

CHEM 111: General Chemistry I	4
CHEM 112: General Chemistry II	4
CHEM 221: Organic Chemistry I	4
CHEM 331: Chemical Instrumentation	4
CHEM 401: Physical Chemistry I	4

MAJOR PROGRAM CONCENTRATION REQUIREMENTS

BIOL 112: Foundations in Cellular and Molecular Biology	4

BIOL 312: Genetics	4
CHEM 101: Introduction to Criminalistics	3
CHEM 197: Scientific Communications I	1
CHEM 198: Scientific Communications II	1
CHEM 199: Scientific Communications III	1
CHEM 222: Organic Chemistry II	4
CHEM 260: Microscopical Methods	3
CHEM 301: Biochemistry	3
CHEM 330: Analytical Chemistry	5
CHEM 341: Inorganic Chemistry	4
CHEM 360: Toxicology	3
PSCI 499: Senior Seminar	3
Choose two of the following: BIOL 421: General Microbiology or higher CHEM 311: Intermediate Organic Chemistry or higher CIS 130: Problem Solving or higher CRIM 101: Introduction to Criminology or higher GEOL 111: Physical Geology or higher POLS 217: Introduction to Public Administration or higher PSYC 251: Abnormal Psychology PSYC 304: Biological Basis of Behavior	6-8
TOTAL MAJOR PROGRAM REQUIREMENTS	65-67
ADDITIONAL ELECTIVES	**18-20**
TOTAL FOR BS DEGREE	120

Coursework must include at least 30 hours earned in 300 or above level courses, of which 12 hours must be in the major.

See 4-year major guides for recommended order in which to take courses
https://www.lander.edu/academics/registrars-office/major-guides.html

2025-2026 PROGRAM REQUIREMENTS

DEGREE: BACHELOR OF SCIENCE
MAJOR: CHEMISTRY
CONCENTRATION: HEALTH SCIENCES

Credit Hours

GENERAL EDUCATION REQUIREMENTS

(For approved courses see the General Education: www.lander.edu/gen-ed.)

A. Core Skills (9 hours)
ENGL 101: Writing and Inquiry I 3
ENGL 102: Writing and Inquiry II 3
MATH 123: Calculus and its Applications 3

B. Humanities and Fine Arts 6
(6 hours selected from 2 different disciplines)

C. Behavioral and Social Perspectives
(6 hours selected from 2 different disciplines)
PSYC 101: General Psychology 3
SOCI 101: Introduction to Sociology 3
If you already have credit for HIST 111, do not take HIST 111R; if you already have credit for HIST 112, do not take HIST 112R; if you already have credit for POLS 101, do not take POLS 101R.

D. Scientific and Mathematical Reasoning
(7 hours selected from 2 different disciplines, 1 lab science required)
MATH 211: Introduction to Statistical Methods I 3
PHYS 201: Introductory Physics I or PHYS 211: General Physics I 4

E. Founding Documents of the United States 3
HIST 111R: United States History to 1877 or
HIST 112R: United States History since 1877 or
POLS 101R: American National Government
If you already have credit for HIST 111, do not take HIST 111R; if you already have credit for HIST 112, do not take HIST 112R; if you already have credit for POLS 101, do not take POLS 101R.

F. World Cultures 3

G. LINK 101: Leadership, Involvement, Networking and Knowledge 1
LINK 101 is required of all new transfer students who have earned less than 24 credit hours of college-level work and all first-time freshmen.

TOTAL GENERAL EDUCATION REQUIREMENTS 35

If all of the General Education requirements are met and/or waived, and the credit hours do not add up to at least 30, the General Education requirements are not complete. If below 30, additional General Education courses from any category must be taken until the total hours add up to at least 30 hours.

MAJOR PROGRAM CORE REQUIREMENTS

CHEM 111: General Chemistry I 4
CHEM 112: General Chemistry II 4
CHEM 221: Organic Chemistry I 4
CHEM 331: Chemical Instrumentation 4
CHEM 401: Physical Chemistry I 4

MAJOR PROGRAM CONCENTRATION REQUIREMENTS

BIOL 112: Foundations in Cellular and Molecular Biology	4
BIOL 202: Human Anatomy	4
BIOL 203: Human Physiology	4
BIOM 111: Foundations in Human Evolution, Genetics, and Homeostasis	4
CHEM 197: Scientific Communications I	1
CHEM 198: Scientific Communications II	1
CHEM 199: Scientific Communications III	1
CHEM 222: Organic Chemistry II	4
CHEM 330: Analytical Chemistry	5
CHEM 341: Inorganic Chemistry	4
PHYS 202: Introductory Physics II or 212: General Physics II	4
PSCI 499: Senior Seminar	3
Choose **two** of the following: (depends on program and school)	6-8
BIOL 204: Microbiology	
BIOL 321: Foundations of Medicine	
BIOM 320: Biomedical Statistics	
CHEM 301: Biochemistry	
EXSC 310: Kinesiology and Exercise Biomechanics	
PHIL 302: Ethics	
PSYC 203: Developmental Psychology	
TOTAL MAJOR CONCENTRATION REQUIREMENTS	65-67
ADDITIONAL ELECTIVES	**20-18**
TOTAL FOR BS DEGREE	120

Coursework must include at least 30 hours earned in 300 or above level courses, of which 12 hours must be in the major.

See 4-year major guides for recommended order in which to take courses
https://www.lander.edu/academics/registrars-office/major-guides.html

2025-2026 PROGRAM REQUIREMENTS

DEGREE: BACHELOR OF SCIENCE
MAJOR: CHEMISTRY
CERTIFICATION: SECONDARY EDUCATION

Credit Hours

GENERAL EDUCATION REQUIREMENTS

(For approved courses see the General Education: www.lander.edu/gen-ed.)

A. Core Skills (9 hours)

ENGL 101: Writing and Inquiry I	3
ENGL 102: Writing and Inquiry II	3
MATH 123: Calculus and its Applications	3

B. Humanities and Fine Arts 6
(6 hours selected from 2 different disciplines)

C. Behavioral and Social Perspectives 6
(6 hours selected from 2 different disciplines)
If you already have credit for HIST 111, do not take HIST 111R; if you already have credit for HIST 112, do not take HIST 112R; if you already have credit for POLS 101, do not take POLS 101R.

D. Scientific and Mathematical Reasoning
(7 hours selected from 2 different disciplines; 1 lab science required)

MATH 211: Introduction to Statistical Methods I	3
PHYS 201: Introductory Physics I or PHYS 211: General Physics I	4

E. Founding Documents of the United States 3
HIST 111R: United States History to 1877 or
HIST 112R: United States History since 1877 or
POLS 101R: American National Government
If you already have credit for HIST 111, do not take HIST 111R; if you already have credit for HIST 112, do not take HIST 112R; if you already have credit for POLS 101, do not take POLS 101R

F. World Cultures 3

G. LINK 101: Leadership, Involvement, Networking and Knowledge 1

LINK 101 is required of all new transfer students who have earned less than 24 credit hours of college-level work and all first-time freshmen.

TOTAL GENERAL EDUCATION REQUIREMENTS 35

If all of the General Education requirements are met and/or waived, and the credit hours do not add up to at least 30, the General Education requirements are not complete. If below 30, additional General Education courses from any category must be taken until the total hours add up to at least 30 hours.

MAJOR PROGRAM CORE REQUIREMENTS

CHEM 111: General Chemistry I	4
CHEM 112: General Chemistry II	4
CHEM 221: Organic Chemistry I	4
CHEM 331: Chemical Instrumentation	4
CHEM 401: Physical Chemistry I	4

MAJOR PROGRAM CONCENTRATION REQUIREMENTS

BIOL 112: Foundations in Cellular and Molecular Biology	4
CHEM 420: Environmental Chemistry	3
PHYS 202: Introductory Physics II or PHYS 212: General Physics II	4
Choose **two** of the following:	6-8
ASTR 101: Introduction to Astronomy or higher	
BIOL 111: Foundations in Ecology, Evolution, and Genetics or higher	
CHEM 222: Organic Chemistry II or higher	
CIS 130: Problem Solving and Programming Methods or higher	
ES 111: Environmental Sustainability or higher	
GEOL 111: Physical Geology or higher	
MATH 141: Single Variable Calculus I or higher	
PHYS 203: Electronics	
TOTAL MAJOR PROGRAM REQUIREMENTS	37-39

TEACHER CERTIFICATION REQUIREMENTS

EDUC 203: Field Experience I	0.5
EDUC 204: Instructional Technology for Teachers	3
EDUC 223: General Pedagogy	3
EDUC 250: Adolescent Development and Learning Communities	3
EDUC 320: Reading and Writing in the Content Area	3
EDUC 321: Foundations of Reading	3
EDUC 329: Field Experience II	0.5
EDUC 429: Clinical Practice A	1
EDUC 461: Clinical Practice B	11
EDUC 499: Teacher Education Seminar	1
PSCI 451: Science Pedagogy	3
SPED 223: PreK-12 Students with Diverse Learning Needs	3
TOTAL TEACHER CERTIFICATION REQUIREMENTS	35
ADDITIONAL ELECTIVES	**11-13**
TOTAL FOR BS DEGREE	120

Coursework must include at least 30 hours earned in 300 or above level courses, of which 12 hours must be in the major.

See 4-year major guides for recommended order in which to take courses
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2025-2026 PROGRAM REQUIREMENTS

DEGREE: BACHELOR OF SCIENCE
MAJOR: ENVIRONMENTAL SCIENCE

Credit Hours

GENERAL EDUCATION REQUIREMENTS
(For approved courses see General Education: www.lander.edu/gen-ed.)

A. Core Academic Skills (9 hours)
ENGL 101: Writing and Inquiry I 3
ENGL 102: Writing and Inquiry II 3
MATH 121: Mathematical Applications or 3
MATH 123: Calculus and its Applications

B. Humanities and Fine Arts 6
(6 hours selected from 2 different disciplines)

C. Behavioral and Social Perspectives 6
(6 hours selected from 2 different disciplines)
If you already have credit for HIST 111, do not take HIST 111R; if you already have credit for HIST 112, do not take HIST 112R; if you already have credit for POLS 101, do not take POLS 101R.

D. Scientific and Mathematical Reasoning
(7 hours selected from 2 different disciplines, 1 lab science required)
MATH 211: Statistical Methods I 3
PHYS 201: Introductory Physics I

E. Founding Documents of the United States 3
HIST 111R: United States History to 1877 or
HIST 112R: United States History since 1877 or
POLS 101R: American National Government
If you already have credit for HIST 111, do not take HIST 111R; if you already have credit for HIST 112, do not take HIST 112R; if you already have credit for POLS 101, do not take POLS 101R

F. World Cultures
CHEM 381: Cultural Perspectives of Pollution 3

G. LINK 101: Leadership, Involvement, Networking and Knowledge 1

LINK 101 is required of all new transfer students who have earned less than 24 credit hours of college-level work and all first-time freshmen.

TOTAL GENERAL EDUCATION REQUIREMENTS 35

If all of the General Education requirements are met and/or waived, and the credit hours do not add up to at least 30, the General Education requirements are not complete. If below 30, additional General Education courses from any category must be taken until the total hours add up to at least 30 hours.

MAJOR PROGRAM CORE REQUIREMENTS

BIOL 111: Foundations in Ecology, Evolution, and Genetics 4
BIOL 306: Ecology 4
BIOL 415: Limnology 4
CHEM 111: General Chemistry I 4
CHEM 112: General Chemistry II 4
CHEM 221: Organic Chemistry I 4
CHEM 331: Chemical Instrumentation 4
CHEM 420: Environmental Chemistry 3
ES 111: Environmental Sustainability 3

or ES 265: Field Methods	
ES 301: Introduction to Environmental Science I	3-4
or ES 355: Geographic Information Systems	
ES 302: Introduction to Environmental Science II	4
or ES 445: Environmental Data Science	
PSCI 112: Earth and Space Science	4
PSCI 499: Senior Seminar	3
MAJOR PROGRAM ELECTIVES	15-20
(Choose five from the following)	
BIOL 112: Foundations in Cellular and Molecular Biology	
BIOL 213: Botany	
BIOL 214: Zoology	
BIOL 303: Evolution	
BIOL 308: Comparative Vertebrate Anatomy	
BIOL 313: Plant Anatomy	
BIOL 409 or CHEM 409: Undergraduate Research	
BIOL 421: General Microbiology	
CHEM 222: Organic Chemistry II	
CHEM 260: Microscopical Methods	
CHEM 301: Biochemistry	
CHEM 330: Analytical Chemistry	
CHEM 341: Inorganic Chemistry	
CHEM 360: Toxicology	
CHEM 401: Physical Chemistry I	
HIST 341: United States Wildlife Conservation History	
POLS 308: Law, Politics, and Society	
POLS 379: Emergency Management	
PUBH 310: Global Health	
PUBH 415: Epidemiology and Biostatistics	
SOCI 363: Environmental Sociology	
TOTAL MAJOR PROGRAM REQUIREMENTS	63 - 69
ADDITIONAL ELECTIVES	**16 - 22**
TOTAL FOR BS DEGREE	120

Coursework must include at least 30 credit hours earned in 300-level or above, of which 12 credit hours must be in the major.

See 4-year major guides for recommended order in which to take courses
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2025-2026 PROGRAM REQUIREMENTS

DEGREE: **BACHELOR OF SCIENCE**
MAJOR: **ENVIRONMENTAL SCIENCE**
CONCENTRATION: **FORENSIC SCIENCE**

Credit Hours

GENERAL EDUCATION REQUIREMENTS

(For approved courses see General Education: www.lander.edu/gen-ed.)

A. Core Academic Skills (9 hours)

ENGL 101: Writing and Inquiry I	3
ENGL 102: Writing and Inquiry II	3
MATH 121: Mathematical Applications or MATH 123: Calculus and its Applications	3

B. Humanities and Fine Arts 6
(6 hours selected from 2 different disciplines)

C. Behavioral and Social Perspectives 6
(6 hours selected from 2 different disciplines)
If you already have credit for HIST 111, do not take HIST 111R; if you already have credit for HIST 112, do not take HIST 112R; if you already have credit for POLS 101, do not take POLS 101R.

D. Scientific and Mathematical Reasoning
(7 hours selected from 2 different disciplines, 1 lab science required)

MATH 211: Statistical Methods I	3
PHYS 201: Introductory Physics I	4

E. Founding Documents of the United States 3
HIST 111R: United States History to 1877 or
HIST 112R: United States History since 1877 or
POLS 101R: American National Government
If you already have credit for HIST 111, do not take HIST 111R; if you already have credit for HIST 112, do not take HIST 112R; if you already have credit for POLS 101, do not take POLS 101R.

F. World Cultures
CHEM 381: Cultural Perspectives of Pollution 3

G. LINK 101: Leadership, Involvement, Networking and Knowledge 1

LINK 101 is required of all new transfer students who have earned less than 24 credit hours of college-level work and all first-time freshmen.

TOTAL GENERAL EDUCATION REQUIREMENTS 35

If all of the General Education requirements are met and/or waived, and the credit hours do not add up to at least 30, the General Education requirements are not complete. If below 30, additional General Education courses from any category must be taken until the total hours add up to at least 30 hours.

MAJOR PROGRAM CORE REQUIREMENTS

BIOL 111: Foundations in Ecology, Evolution, and Genetics	4
BIOL 306: Ecology	4
BIOL 415: Limnology	4
CHEM 111: General Chemistry I	4
CHEM 112: General Chemistry II	4
CHEM 221: Organic Chemistry I	4
CHEM 331: Chemical Instrumentation	4

CHEM 420: Environmental Chemistry	3
ES 111: Environmental Sustainability or ES 265: Field Methods	3
ES 301: Introduction to Environmental Science I or ES 355: Geographic Information Systems	3-4
ES 302: Introduction to Environmental Science II or ES 445: Environmental Data Science	4
PSCI 112: Earth and Space Science	4
PSCI 499: Senior Seminal	3

MAJOR PROGRAM CONCENTRATION REQUIREMENTS

CHEM 101: Introduction to Criminalistics	3
CHEM 260: Microscopical Methods	3
CHEM 360: Toxicology	3
Choose three from the following: BIOL 112: Foundations in Cellular and Molecular Biology BIOL 213: Botany BIOL 214: Zoology BIOL 303: Evolution BIOL 403: Molecular Genetics BIOL 409 or CHEM 409: Undergraduate Research BIOL 421: General Microbiology CHEM 222: Organic Chemistry II CHEM 301: Biochemistry CHEM 330: Analytical Chemistry CHEM 341: Inorganic Chemistry CHEM 401: Physical Chemistry I CRIM 101: Introduction to Criminology POLS 308: Law, Politics, and Society POLS 313: Judicial Process POLS 379: Emergency Management PUBH 415: Epidemiology and Biostatistics SOCI 363: Environmental Sociology	9-12
TOTAL MAJOR PROGRAM REQUIREMENTS	66-70
ADDITIONAL ELECTIVES	**15-19**
TOTAL FOR BS DEGREE	120

Coursework must include at least 30 credit hours earned in 300-level or above, of which 12 credit hours must be in the major.

See 4-year major guides for recommended order in which to take courses
https://www.lander.edu/academics/registrars-office/major-guides.html